

### **Remarks**

In view of the foregoing amendments and the following remarks, Applicants respectfully request reexamination of the present application. Claims 2, 3, 13, 17, 21, 22, 25, 30 and 31 have been amended and new Claims 50-62 have been added. Applicants acknowledge with appreciation that Claims 33-49 are allowed.

### **35 USC Section §112 Rejections**

The Examiner has rejected Claims 2, 13, 14 and 17-32 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter applicant regards as the invention.

The Claims have been amended to address the Examiner's concerns. Claim 2 has been amended to change "said flow channels" to "said first flow channels." Claim 13 has been amended to change "said cooling device" to "said device." Independent Claim 17 has been amended to change "said cooling device" and "said device" to "said water extraction device." Therefore, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. 112.

### **35 USC §102 Rejections**

The Examiner has rejected Claims 1, 3-5, 8, 9, 11-23, 26, 27 and 29-32 under 35 U.S.C. 102(b) as being anticipated by the sorber structure (device) of U.S. Patent No. 5,268,022 by Garrett et al. The Examiner merely states that the claims are clearly anticipated by the sorber structure (device) of Garrett et al. Applicants respectfully traverse this rejection.

### **Relevant Legal Doctrines – 35 USC §102**

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920

(Fed. Cir. 1989). Applicants submit that the Examiner has not met the burden required under 35 U.S.C. §102 with respect to Garret et al.

**U.S. Patent No. 5,268,022 by Garret et al.**

Garrett et al. disclose a device for the separation of a gas mixture. The device includes a vessel that contains an adsorbent bed that preferentially adsorbs one gaseous component of a gas mixture. The vessel also has a conductive heat member disposed within the adsorbent bed that contains a liquid medium. Col. 2, lines 30-35. The conductive heat member is used to transfer heat by convection from a maximum temperature region to a minimum temperature region within the adsorbent bed. Col. 2, lines 35-38. The liquid medium contained in the conductive heat member may be water, with a substance to lower the freezing point, or an organic liquid that has a freezing point below 0°C. Col. 2, lines 50-55. The conductive heat member reduces the magnitude of the temperature difference in the hot and cold regions of the adsorbent bed. Col. 2, lines 65-68 and is made of a heat conductive metal such as copper or brass. Col. 6, lines 31-36.

Garrett et al. also disclose a layer of desiccant particles above the adsorbent bed to adsorb water from the gas stream. Col. 5, lines 66-68. The conductive member extends from the minimum temperature region which occurs near the top of the adsorbent layer, but below the interface between the adsorbent layer and the desiccant, to the maximum temperature region which occurs slightly above the bottom of the adsorbent layer. Col. 6, lines 23-29.

The present invention as recited in independent Claims 1 and 17 is directed to a device for removing water vapor from a gas stream. The device includes a desiccant and a phase-change material that is in thermal communication with the desiccant. Garret et al. does not disclose or suggest a phase change material in thermal communication with a dessicant.

As disclosed in Garrett et al., the layer of dessicant particles is located above the layer of adsorbent particles. Col. 6, lines 23; Fig. 2. Garrett et al. disclose that the conductive heat member filled with the liquid medium, which the Examiner apparently

equates to a phase-change material, conducts heat from the gas adsorbent layer. Garrett et al. teach that the conductive heat member extends only within the adsorbent layer 38. Col. 6, lines 23; Fig. 2. The top of the conductive heat member is aligned with the horizontal plane that includes the minimum temperature of the adsorbent layer 36, which is typically 33 to 66 cm away from the dessicant particle layer 38. Col. 6, lines 20-21. Thus, Claims 1 and 17 are allowable over Garrett et al. because Garrett et al. fail to disclose a dessicant in thermal communication with a phase-change material.

For a substance to be a phase-change material it must undergo a phase-change during operation and absorb heat upon the phase-change. The disclosure of Garrett et al. makes clear that the water is being used to conduct heat between hot and cold regions of the adsorbent bed, which is not the same as a phase-change material adapted to absorb heat. Indeed, the teachings of Garret et al. are inconsistent with using a phase-change material. Garrett et al. consistently refers to a "liquid" medium. A phase-change material does not remain in a single state, but changes phases, e.g., from a solid to a liquid. Additionally, Garrett et al. disclose that the water used as the liquid medium can be modified to *avoid* a phase-change by adding a substance to the water to lower the freezing point, or alternatively an organic liquid with a freezing point below 0°C can be used. Thus, Garrett et al. does not disclose the use of a phase-change material.

Claims 3-5, 8, 9 and 11-16 are dependent on Claim 1 and are allowable for the same reasons as Claim 1. Claims 18-23, 26, 27 and 29-32 are dependent on Claim 17 and are allowable for the same reasons as Claim 17. Additionally, each dependent claim recites additional limitations that make them further patentable. For example, Claims 18 and 19 recite a type of climate-controlled enclosure that is not disclosed by Garret et al.

### **35 USC §103 Rejections**

The Examiner has rejected Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Garrett et al. in view of U.S. Patent No. 3,734,293 by Biskis. The Examiner has rejected Claims 6, 7, 24 and 25 under 35 U.S.C. 103(a) as being unpatentable over Garrett et al. in view of U.S. Patent No. 6,559,096 by Smith et al. The Examiner has rejected

Claims 10 and 28 under 35 U.S.C. 103(a) as being unpatentable over Garrett et al. in view of U.S. Patent No. 6,298,908 by Colvin et al.

### **Relevant Legal Doctrine – 35 USC §103**

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In addition, there must be a teaching or suggestion to make the claimed combination and a reasonable expectation of success that are found in the prior art, and not in the applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

### **U.S. Patent No. 6,298,907 by Colvin et al.**

Colvin et al. disclose a pad for thermal control. Col. 1, lines 10-13. The pad is adapted to overlie an area that is to be thermally regulated. Col. 1, lines 66-67 through Col. 2, line 1. A number of macrocapsules containing a phase-change material are dispersed within the pad to control or regulate the temperature of an area. Col. 2, lines 1-5. Depending on the selection of the phase change material, the pad may be used to cool or to warm an overlying area. Col. 2, lines 56-62. Some phase-change materials disclosed by Colvin et al. include paraffinic hydrocarbons and water. Col. 2, lines 8-9.

Claim 2 is dependent on Claim 1 and is allowable for all the same reasons as Claim 1. Moreover, the combination of Garret et al. and Biskis fail to disclose all the limitations of Claim 2, namely the combination fails to disclose a device that removes water vapor from a gas stream, the device including a desiccant and a phase-change material that is in thermal communication with the desiccant, wherein the phase-change material undergoes a phase-change during operation of said device.

Claims 6 and 7 are dependent on Claim 1 and are allowable for all the same reasons as Claim 1. Claims 24 and 25 are dependent on Claim 17 and are allowable for all the same reasons as Claim 17. As stated above, Garret et al. fail to disclose a device that removes water vapor from a gas stream; the device including a desiccant and a phase-change material that is in thermal communication with the desiccant, wherein the

phase-change material undergoes a phase-change during operation of said device, and Smith et al. fails to make up the difference.

Claim 10 is dependent on Claim 1 and is allowable for all the same reasons as Claim 1. Claim 28 is dependent on Claim 17 and is allowable for all the same reasons as Claim 17. The combination of Garret et al. and Colvin et al. fail to disclose all the limitations of Claims 10 and 28. Even in combination Garret et al. and Colvin et al. fail to disclose a device including a desiccant and a phase-change material that is in thermal communication with the desiccant, wherein the phase-change material undergoes a phase-change during operation of said device.

Applicants have added new Claims 50-62. New Claim 50 corresponds to Claim 4 in independent form. It is respectfully submitted that these claims are also allowable over the prior art.

The fee for the additional claims (small entity) is calculated below:

For	Claims Remaining After Amendment	Highest Number Previously Paid For		Extra Claims	Rate		Additional Fee
Total Claims	62	-49	=	13	x 9\$	=	\$117
Independent Claims	4	-3	=	1	x 43\$	=	\$43
Multiple Dep. Claim		-	\$290			=	\$
Total Fee						=	\$160

A check in the amount of \$160 for the payment of this fee accompanies this response. Please charge any underpayment and credit any overpayment to Deposit Account No. 50-1419.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecute and or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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